COMPUTERWORLD

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Users React Against Plan to Drop Cobol F

ATLANTIC CITY, N.J. – A leading group of Cobol users delivered a formal protest to IBM last week, opposing the company's plan to phase out compiler and object program support for Cobol F on the System 360 [CW, Nov. 6].

The protest by the joint Share/Guide Cobol Project members asked that Cobol F support be continued.

Contrast to 1967

The action was in marked contrast to the group's passive response a year ago when IBM announced it was restricting its support of its Cobol and Fortran compilers. At that time, neither of the languages had a body of supporters sufficiently organized to mount an effective protest. But things now appear to have changed, at least as far as Cobol is concerned.

Cobol Victories

The Cobol forces had some major victories under their belts before the meeting started. A new series of USASI Standard Cobol compilers was announced recently by IBM [CW, Nov. 6] which included 15 of the 19 extensions to the language that the joint Share/Guide Cobol meeting had requested. The announcement of new compilers was in general well accepted, and the apparent ease of program conversion promised for the new systems was welcomed by the committee.

However, the simultaneous announcement by IBM that it was phasing out both the compiler and object program support for the main Cobol F compiler – which is used by most of the large firms – was opposed and a formal protest was read by the committee chairman, Don Stanford, at the meeting at which the IBM actions were announced. The committee's objection was based primarily on the fact that the action would force users to convert at a time

(Continued on Page 16)

AT&T Wins a Delay On Revised Tariffs

By a CW Staff Writer

WASHINGTON, D.C. – The Federal Communications Commission has granted American Telephone & Telegraph Co.'s request to delay, from Nov. 1 to Jan. 1, the implementation of tariffs permitting the attachment of customer owned devices to the public telephone system. The old tariffs, with one exception, will remain in effect until then.

The FCC said that the delay was granted to allow it more time to consider AT&T revisions to the proposed tariffs it filed with the FCC in September. These revisions would permit the connection of

(Continued on Page 3)

Software Firm Pursues New Market for PDP-8s

WELLESLEY HILLS, Mass. – An attack on two markets has been launched by a new firm here. Infocom, Inc. is going after the people who do not feel service bureaus offer enough privacy and after the software market represented by the users of 3500 small scale scientific PDP-8 systems.

The Infocom product is business oriented software – payroll, accounts receivable, etc. – which can be used when a firm's PDP-8 is not being used for scientific purposes. A typical case, according to Michael Ford, Infocom president, would be a firm that uses its computer for typesetting. He feels the company also would like to use it for keeping tabs on circulation, advertising, etc., tasks which are not easy to perform with word oriented hardware systems. Most business applications are character oriented.

The basis of the market plan lies in a business oriented language, Saibol, developed by Dr. Wilbur Highleyman of Sombers Associates, Inc., Lake Hiawatha, N.J., and named after his firm (SAI) and Business Oriented Language (BOL). The compiler resembles a Cobol compiler in some ways but was designed specifically for the scientific type of computer.

In fact, it requires only a 4K PDP-8. The compiler is held entirely in core and does not require tape units or disk drives. However, Infocom recommends the use of a Teletype paper tape reader and magnetic tape or disk storage.

The marketing of the system has begun with a basic charge for the Saibol compiler ($4000) and additional charges for specific programs such as payroll ($1000) and job cost ($2500). Details of the Saibol language are shown on page 10.

Computer Aided Typists Produce Perfect Copies

CHICAGO – A small 4K computer, dedicated to the editing of typist copy and time shared by up to four typists, was introduced at the Bema exhibition here last week.

The computer is hidden in a desk, leaving the typists without any apparent controls. They type at rough draft speed and the data is stored on magnetic tape. After the typing has been completed (obvious mistakes can be corrected by back-spacing and retyping), the typist notes other corrections as footnotes. These are incorporated into the text and, according to the manufacturer, immediate error free typing to 150 wpm is created.

The manufacturer, Information

(Continued on Page 8)

Sniffing for Dirty Air

Edward L. Stockton, chief of the Allegheny County, Pa., Health Department's Bureau of Air Pollution Control, checks one of the rooftop sensing devices which feed data to the bureau's computer. Story on page 9.

IBM Extends Support Life of Release 14

By a CW Staff Writer

NEWTON, Mass. – In response to inquiries by *Computerworld*, IBM said this week that it would extend support of Release 14 until June 16, 1969 for MFT (Multiprogramming with a Fixed number of Tasks) users who want time to check the Check Point/Restart facilities. These were dropped with Release 15/16 of the IBM 360 Operating System. Support had been scheduled to end Nov. 30.

Many Cobol users have complained that they have been forced to run without a Check Point/Restart for some months because of changes in the IBM software. IBM pointed out that customers had been warned in October 1967 that the facility would not be available with the initial release of MFT-II. The warning, sent to the marketing organization but not to customers, included instructions to the salesmen to advise customers of this fact.

Changes Involved

The problem resulted from two changes in the System 360 software. MFT-I was replaced Aug. 30 by MFT-II, and the Check Point/Restart macro used in MFT-I is to be replaced by an Advanced Check Point/Restart which won't be available until next summer. The change left customers with a choice of staying with unmaintained and faulty software for nine months or switching to MFT-II and temporarily dropping the Check-point/Restart. This would mean they could not restart long runs if anything went wrong with the system.

Maintenance Change

The change in maintenance philosophy for Release 14 is the second involving this release. Until this fall, IBM supported a release only for 30 days after it had been replaced by a later one. However, when Release 15/16 came out, the period was increased to 90 days for OS users. The extension for Release 14, which provides for maintenance for an extra six and a half months, appears to be restricted to those users who have decided to stay with Release 14 because of the need to use restart in the installations.

No change is involved for the MVT (Multiprogramming with Variable Tasks) software. Check Point/Restart for MVT is scheduled to be available in June, 1969 with MFT-II.

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Share, Guide 'Rehearse' for Merger

By a CW Staff Writer

ATLANTIC CITY, N.J. – The Share and Guide organizations met – together with many hundreds of IBMers – in the same hotels here last week in a dress rehearsal for a possible combination of the two groups.

Prophecies of pandemonium from the combination were not fulfilled, although a number of the sessions had standing room only. The number of concurrent sessions was normally between 12 and 14, posing problems for attendees trying to cover many areas.

In addition to the official meetings, many "birds of a feather" unofficial groups also were meeting throughout the week. These meetings were informally called using the large bulletin boards – which also nowadays are beginning to hold a number of "agony column" notices calling for software for systems no longer being marketed – like 7070 sorts.

The election of Share officers was held the first day, with no electioneering and only minimal data on the candidates provided to the membership. John M. Noerr, assistant manager, Corporate Systems & Computing Department, Sinclair Oil, was elected president. Phil Dorn of Union Carbide was chosen vice president. Tom Theberge, of McDonnell-Douglas, was unopposed for secretary – a normal situation because the duties are quite onerous – and T.A. Dolotta, Professor Carl Roessler, and F.J. Balint were elected to the executive board. As far as could be seen, the winners tended to be those who had had the longest connection with Share activities rather than any other particular characteristic.

T. Vincent Learson, president of IBM and the keynote speaker, stressed the problems of reliability, manpower, and privacy/security. His point on reliability was based on IBM's need to know just how important it was to its customers – i.e., how much extra they would pay for having greater reliability built in.

In the software area he commented that IBM was trying to create modules that would not be affected by later releases and to increase the length of time between software releases.

COMPUTER EQUIPMENT WANTED

If you own computer systems or components, and wish to replace or upgrade them, IPS will purchase or broker your present equipment. Among equipment now wanted are 360/30 and 360/40 CPU's or systems, a 360/65 CPU or system, 360 peripherals, a 7074 10K (1963 vintage or later), H-200 tape systems, and IBM 729's, 1402's, 1403's, 1301's, 1406's, and 1419's. For estimates or quotations, please write or call with complete specifications and firm release date. NOTE: IPS does NOT handle equipment now RENTED from the manufacturer.

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Study Challenges Validity of PAT Test

ATLANTIC CITY, N.J. – Business programmers who score a B on the IBM Programmer Aptitude Test (PAT) are more likely to be successful than those who score an A, according to validity studies carried out by an ACM group and reported to the Share/Guide meeting last week.

The figures showed that 64% of the business programmers who received B scores were later rated as being among the top half of the programming staff, according to their supervisors. By contrast, of those scoring A only 51% were rated in the top half, and this compared for instance with the performance of the D group who achieved a 42% "good" rating.

There was a direct contrast between this experience and that when the group investigated the PAT test for the scientific area. Here the categories followed the expected trend, with 70% of the As being rated high and only 31% of the Ds.

Interviews Not Helpful

D.B. Mayer, a member of the ACM Program Research Group, said that the PAT test was not telling the business group very much about programming capabilities. He pointed out that there was a major difference between the capability to carry through a course of instruction carefully and being productive on the job. He also stated that other aids, such as interviews, had been found inadequate.

He was able to offer only one good predictor of how a programmer would work out – and that was how he had worked out in a previous programming job. He said he did not believe that reports on how people had performed in other nonprogramming jobs were of help.

PAT Widely Used

The PAT test, despite the previous lack of validation, has been very widely used. Mayer particularly pointed to its use in testing systems analysts and said that such use had been completely unvalidated. In fact, he believed the prime reason for the use of the test was the inclusion of the words "programmer" and "aptitude" in the name.

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Brandon Test Attacked, Brandon Says He's Glad

By a CW Staff Writer

ATLANTIC CITY, N.J. – In an apparently planned 15 minute presentation at the end of the Share session here, Dave Mayer of IBM made a vitriolic attack on both the Brandon aptitude test and on Dick Brandon, personally. He described Brandon as a money-grubber, and said his marketing of the Brandon test was "in breach of any set of professional ethics which I can imagine!" Apparently oblivious of the ACM code of ethics which forbids such attacks on fellow professionals, Mayer was allowed by the chairman of the organization and by his audience to complete the attack without interruption.

No Brandon representatives were registered for the conference, and it would appear unlikely that they would have been accepted for registration under Share/Guide rules.

Mayer based his attack on the fact that Dr. Jack Wolfe, who wrote the test, was a doctor of mathematics rather than a doctor of psychology, and that Brandon had refused to supply him (Mayer) with details of its validation. Mayer pointed out that the idea that persistance was a requirement for good programming aptitude was not one which had been validated in the literature. A member of the audience later said he believed that some validation had been published, but this was later denied by the publishers of the Brandon test.

"Glad IBM Attacking"

On hearing of the attack, Dick Brandon said he was glad that IBM was at last attacking his test. He claimed that his validation (which has not been officially published) was more substantive than IBM's validation of the PAT test, and pointed out that PAT was written in 1953 before many people, probably including IBM, knew what a programmer was.

Brandon ascribed the success of the IBM test in becoming a de facto standard to the fact that it was available free. By contrast, he said, the Brandon test is tied to performance on the job and is not time dependent as is the IBM test. He said that people who use it are very happy with it and that he, personally, was convinced that his test was better than the IBM PAT test.

Naked Youth Pickets Computers

ATLANTA – Computers have been accused of a lot of things, but a new charge cropped up here when a naked youth stood in front of the IBM Building carrying a sign which read, "Computers are Obscene."

The youth, identified by police as Raymond Schoolfield, 18, of San Antonio, Texas, attracted a large crowd after he dropped his clothes off. About 10 minutes later, police arrived, charged him with indecent exposure, and took him away.

"He was just standing there, stark naked, looking at the traffic coming down Peachtree Street," a witness said.

Word of the event spread rapidly and workers flocked to office windows for a look.

Kathi Krill, Marsha Schrieder, and Molly Smith, top to bottom, lend a space age touch to the opening of the Nisarc center.

First 'Total Information' Center Opens

By a CW Staff Writer

HARTFORD, Conn. – The first of a planned nationwide network of "total information" centers has opened at 107 Constitution Plaza here to assist the public in obtaining rapid, accurate, and up to date information on new homes, new jobs, and colleges.

Operated by Nisarc (National Information Storage and Retrieval Centers), with headquarters in New York City, the center charges $5 to provide an individual with a complete rundown on all housing or jobs it has listed that meet his specifications. A rundown on colleges offering specified courses costs the inquirer $10.

If desired, an individual can fill out a form obtained from the center, mail it in with a check, and receive a printout by mail, thus avoiding a trip to the center.

A second center is scheduled to open in Boston by the end of February, and a third is scheduled for New York in the spring. The schedule of openings has been somewhat delayed. Originally, 10 centers had been scheduled to open before the end of this year.

Operates By Time Sharing

The center here uses two IBM 2740 terminals tied to an IBM time sharing center in New York. Stored in the computer are reference numbers which are retrieved using Call/360 Basic and are used to guide attendants at the center to microfilm frames containing the desired information.

Nisarc President Joel Tenzer told *Computerworld* that as additional centers are opened, each will receive duplicate microfilms from all the others so that a person in one city can ask about information listed in other cities.

"While some attempts have been made in the past to perform one or more of these functions, by and large they have been restricted to only one activity, and they have not been completely objective," Tenzer said. "Until now, no single operation has attempted to pull all of these activities together under a single computerized roof and do so on a national scale."

By 1970, Nisarc hopes to have many of the nation's major cities hooked into the network through franchised centers, Tenzer said.

Rates have not been completely established, he said, but currently the Hartford center is charging $2 per listing for employers and real estate brokers, with a minimum monthly charge of $40.

Individuals looking for jobs can list their resumes for $5, he said.

There is no charge to colleges for listing their courses and entrance requirements, Tenzer said.

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Revised Tariffs On Attachments Delayed by FCC

(Continued from Page 1)

customer owned communications systems and channels to the public network.

Carterfone Not Affected

Not included in the delay is the inductive or acoustic connection of private mobile radio systems to the telephone network. The action is the result of an FCC ruling on the Carterfone case in June that the telephone companies' present foreign attachment bans are unlawful [CW, July 10].

However, in spite of the proposed widened use of customer owned equipment, AT&T is still maintaining that "in the interest of assuring the quality of communication service to the general public, these tariff provisions contemplate that all connections to the network will be made through a [dial or push button] network control unit and [an interface] provided and maintained by the telephone company."

AT&T has said that the interface devices will rent for $2 a month. Critics claim that the devices could be built into equipment for only a few cents, and are trying to force AT&T to allow manufacturers to build the interfaces according to AT&T specifications.

1000 Reservation Terminals Ordered

NASHUA, N.H. – Planning Research Corp., Los Angeles, has ordered 1000 special terminals from Sanders Assoc. here for a worldwide reservation system for hotels, car rental agencies, airlines, and travel agencies. To avoid keying errors, most essential data can be entered by setting a series of dials mounted next to the keyboard.

Sanders Teletype

Editorials

What Do They Record?

Recently there has been discussion in our pages about the legality of computer records. In some ways the discussion appears to have missed the key problem involved. This is, what do the computer records record?

As far as we can see, all that they record is, at best, a copy of the status of the "records" during the last update operation. They are not a record of the original input any more than a monastic scripture, copied from generations of other copies made over the centuries, is necessarily a record of the original document.

Moreover, to provide evidence of correct recording – at least if there is no audit trail – it would be necessary to provide evidence of the condition of the software – both operating system and program – at the time of each updating. This frequently will include some 50 or more cases a year.

Under these circumstances, *Computerworld* cannot see that we can currently dispense with audit trails except under quite exceptional circumstances. It would be nice if we could do so. It would save us some work. But our records could not be verified by independent examiners and consequently would not be free from suspicion.

The Price of Free Software

The rebellion by members of the joint Share/Guide Cobol project against the unilateral decision of IBM to phase out a major Cobol compiler has brought out two things clearly. On the one hand it shows that a group of determined users, backed by a good case, can make themselves heard through standard channels. It also underlined some facts about the true cost of "free" software.

The key point is that software, which is essential to the use of a system, requires constant maintenance. It is not true that once you receive a specific compiler you can go on to use it indefinitely. It requires maintenance – free or not.

Free software, as opposed to paid software, never genuinely belongs to the user. It belongs to the supplier. The supplier can withdraw it at will. He can put it on local maintenance, which currently means that he need not even inform his users of any bugs or solutions that he knows about. He can, by unilateral decisions, practically force users to discontinue use of the software.

By contrast, paid software presumably would provide for guaranteed maintenance. This in turn would allow planning which would not be subject to sudden, unpleasant surprises.

Computerworld believes that any system which does not allow a user to plan ahead with confidence cannot be regarded as other than bad – and that having such a bad system is the true price we are currently paying for our "free" software.

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Viewpoint

Patent Guidelines Make Programmers 'Second Class Citizens,' Jones Says

By Richard Jones
President, Applied Data Research

The new guidelines set down by the commissioner of patents for his office in deciding whether to approve patent applications include provisions which have been reported as making computer programs unpatentable.

In this article, Richard Jones, president of Applied Data Research and a leader in the fight for patent protection for programs (which may be different from patenting programs as such), reacts to the guidelines, which he says make programmers "second class citizens."

Responsible rebuttal is invited.

Much has been said recently about the legal considerations of protecting software. My position is that the software manufacturers need patents and are entitled to them. The main opposition is from the hardware manufacturers since they use "free" software like green stamps to assist in their equipment sales. There is no question that hardware developments are patentable.

Professor Kayton and Morton Jacobs did a good job at the Computers-in-Law Conference in pointing out the many instances of engineering equivalence of hardware and software. Why then cannot the same *invention*, if more appropriately embodied in software, be patented without the subterfuge of describing it as hardware?

The new Patent Office guidelines discriminate against the software business. Programmers aren't second class citizens . . . nor are they second class inventors.

Why the Controversy?

If programs are not patentable, why did the administration and the Patent Office go to the expense to propose Section 106 of the Patent Revision Act to legislate against it? And why, after that section was deleted from the proposed legislation, did the Patent Office take the position that programs are not patentable? The patent commissioner has said that there was a great deal of controversy on this question. Why not resolve this controversy in favor of small business for a change and let big business foot the legal bill for contesting it?

The commissioner said, "Patents are intended to protect novel and unobvious inventions, regardless of the form or appearance in which they may be manifested." That doesn't mean to me that a group of people should be deprived of patent protection because of the Patent Office's real or imagined administrative difficulties. We are not asking for special treatment. Just give us equal rights with our competitors, the hardware manufacturers.

"Instant Hardware"

A very high percentage of programs are not processes which can be performed solely by mental acts. The fact that such processes are implemented on a computer would indicate that they are more suitable for a machine than a person. The formulation of any process is an inventive mental act, but we don't think of an oil refinery as a mental process when it is in operation. Why are programs singled out for this special honor? Is it because of the form or appearance in which they may be manifested? That is not supposed to matter, according to the commissioner. Professor Kayton has used the term "instant hardware" to describe the effect of a computer program combination – and that is a very good way to think of the character of software.

After patent protection is granted for program inventions, many small and large businesses will be encouraged to invest their capital to develop "instant hardware." However, before this business can blossom to its fullest potential, a fair competitive marketplace must exist.

The myth of free software has been exposed to some extent. The users of computers realize that the hardware manufacturer is making a "tie-in" sale of hardware and software. This makes it very difficult for the software manufacturer to compete even though his product may be clearly superior to the one provided by the hardware manufacturer.

I could comment at length about how the user would benefit from the separation of hardware and software prices, mentioning such items as: reduction of programming costs, increase in machine efficiency, and reduction of equipment and therefore rent.

I could dwell on the motivations of the hardware manufacturer to sell more equipment and how the "tie-in" sale permits him to do this.

Are Tie-In Sales Legal?

But the real issue is the legality of this "tie-in" sale. There have been precedents where such practices have been held to be antitrust violations. It has followed that when a competitive market was created, the customer saw prices go down and quality of service improve, and many new companies were given an opportunity to compete.

In summary, let me say that we are not asking for any special consideration. We want the opportunity to protect our investment in inventions under the patent system and a fair opportunity to sell these products in a competitive market.

Letters to the Editor

How to Get Rubey Report

To the Editor:

I would like to obtain a copy of the full report prepared for the Air Force by Logicon Inc. comparing PL/I to Cobol and Fortran.

C.D. Picard
Electronic Data
Processing Officer
National Bank of Washington
Tacoma, Wash.

Copies of "Comparative Evaluation of PL/I" (AD 669 096) may be ordered from the Clearinghouse, Springfield, Va. 22151. The price is $3. Ed.

Employment Fiction

To the Editor:

Congratulations to Yvonne Cardemill [CW, Sept. 18] for discussing a situation which would be humorous in its irony if it were not so tragic. We have been assaulted for years with the prospects of easily training any reasonably intelligent person to program through "higher level languages." Yet the help wanted ads dramatically reveal the desperate demand for BAL/DOS/BOS/Cobol, etc. type experience. If software were doing its job, it is precisely this experience that should not be needed.

We simply *must* come to a mature understanding that a really successful business system using a computer as a principal tool is designed and installed by analysts who:

1. Fully understand their company, its goals and philosophies.
2. Clearly comprehend man-machine relationships at every level from clerk and factory worker to middle and top management.
3. Have been trained to think clearly and logically so that they can express the job to be done in the simplest possible patterns and relationships.
4. Are thoroughly familiar with the capabilities of data processing equipment and other tools available.

The translation of this understanding and ability into a computer system should be a facile step unencumbered by a morass of hardware and software limitations.

The tragedy is that there are so many unknowing victims of the tyranny of unnecessarily complex hardware and software. I cringe when I hear of companies spending far more than necessary for the results derived, or installations bogged down for months because of late or poor software. So many managements are bewildered by the vast array of jargon we throw at them that they all but give up on making sound business decisions regarding their computer.

I live for the day when our "Help Wanted" emphasis can be on business and systems design experience, not on the technicalities of specific software or hardware.

Edward C. Marzo
Manager,
Administrative Services
William Carter Co.
Needham Heights, Mass.

Rubey Report - Part II

Questioning the Questionnaires Used in the Study

Answers To Apparently Clear-Cut Questions

In the *Computerworld* investigation (see story) we identified 19 cases where the experience in programming test cases should have been directly reflected in the answers given by the original programmers, and should have been supported by the analysts when they reviewed the answers.

The 19 cases are listed below, together with the *Computerworld* version of the apparent answer, the answer provided by the programmers, and the review answer by the analyst. (A ○ indicates in favor of PL/I, a ● against PL/I, and a ... indicates no opinion.)

	Observation Based Answer	Programmer Answer	Analyst Answer
Conciseness			
ALOREP2 (The PL/I program was 30% the size of the Cobol program)	○	○	○
MMI (The Fortran program was 65% the size of the PL/I program)	●	○	○
VIG (The Fortran program was 70% the size of the PL/I program)	●	●	○
SPP-A (The PL/I program was 80% the size of the Jovial program)	○	○	○
SPP-B (The Jovial program was 85% the size of the PL/I program)	●	○	○
Error-proneness			
GROSS PAYROLL (The Cobol program had 70% of the PL/I program errors)	●	●	...
ALOREP2 (The PL/I program had 85% of the Cobol program errors)	○	○	...
TSME (The Fortran program had 50% of the PL/I program errors)	●	●	...
VIG (The Fortran program had 20% of the PL/I program errors)	●	...	...
SPP-A (The Jovial program had 70% of the PL/I program errors)	●	○	...
SPP-B (The Jovial program had 25% of the PL/I program errors)	●	○	...
Programmer Productivity For This Problem			
GROSS PAYROLL (The Cobol program was written in 55% of the PL/I programming time)	●	●	●
ALOREP2 (The PL/I program was written in 45% of the Cobol time)	○	○	○
VIG (The Fortran program was written in 65% of the PL/I time)	●	●	○
SPP-A (The PL/I program was written in 65% of the Jovial time)	○	○	...
Suitability to This Problem			
GROSS PAYROLL (The Cobol program took significantly less time to write, less computer time to check out, less object space, and ran faster than the PL/I program)	●	●	●
MMI (The Fortran program took less computer time to check out, less object space, and ran faster than the PL/I program)	●	○	○
TSME (The PL/I program took less object space and less computer time to check out)	○	○	○
VIG (The Fortran program took less programmer time to write, less computer time to execute, less object space. [No execution on comparable systems was performed.])	●	...	...
Comparative Ratio	13 to 6 against PL/I Judged by Reported Observations	6 to 11 in favor of PL/I Reported by Logicon Programmers	2 to 9 in favor of PL/I Reported by Logicon Review Analysts

The figures above show a contradiction between the reported observations and the judgments made by the Logicon programmers and the Logicon analysts when they filled in the questionnaires for this study.

The Rubey Report, "A Comparative Evaluation of PL/I," was a publicly funded report based on perhaps the most thorough comparative testing of programming languages ever conducted. For the study a series of programs representing application areas suitable for Cobol, Fortran, and Jovial were selected, carefully and completely defined – and then programmed under controlled and observed conditions in both PL/I and in one of the comparison languages. When the report was published, Computerworld *covered it and stated that it showed that PL/I was hard to learn and error-prone.*

Our report was criticized. It was pointed out that the study results apparently disagreed with our coverage. In last week's article this was conceded – but it was contended that the study results as reported by the Rubey team did not reflect the facts gathered while the test programs were being written, and that our report was based on these, rather than on the study results.

In summary, when professional programmers with math degrees were used, PL/I programs were observed to cost more, and to run slower, than the standard language programs. And, in business application areas, the PL/I programs used more core than the other languages.

Despite these observed and reported facts, the Study Results section of the report says, "Insofar as it was possible to determine within the scope of this study, PL/I provides capabilities for the efficient solution of problems in all of the application areas, at least to the same extent as the comparison languages."

To check the validity of the questionnaires used in the study, *Computerworld* made three separate investigations. These covered the relationship between what actually occurred during the programming tests and what was reported on the questionnaires; the relationship between the questions asked on the questionnaires and the major advertising claims currently being used by IBM to advertise PL/I, and the problem of machine independence.

In checking the relationship between the questionnaires and the actual happenings, we looked at each of the questions to see if the observations made during the study would clearly allow the programmers to answer the questions from their experiences. To our surprise we were able to find only four such questions (suitability to problem, conciseness, programmer productivity on the problem, error-proneness).

How Facts Were Reported

We then found that in the 28 cases where each of these four questions had been completed for the seven programs, 19, or more than half, had clear cut answers which should be reflected in the study. Six of these were in favor of PL/I, and 13 were in favor of the comparison languages.

Having determined this, we then examined how the programmers had answered these questions. We discovered that the programmers tended to slant the results in favor of PL/I and that when reviewed by the analyst, the slant was even more in favor of PL/I. By the time the review had been completed, while actual figures observed in the report were 70% in favor of the comparison language, the figures reporting the opinions of the analysts changed this to 82% in favor of PL/I.

Questionnaire Design

Examining the questionnaire further, we checked to see if it was designed in such a way as to slant the results towards PL/I. First, we noted four main selling points as defined in IBM advertising literature (ease of learning, ease of use, generality, programmer productivity).

Our examination showed that 10 of the 23 questions were directly related – that is, the same wording was used as appeared in the four major promotion claims of PL/I.

By contrast we saw no reference to the main objections against the language, such as unavoidable object program inefficiency and failure to protect programming investments.

Machine Independence?

One other set of answers particularly interested us. Apparently everyone agreed that PL/I was as machine independent as Cobol, and more so than Fortran or Jovial. This appeared strange, as currently PL/I is publicly available only for a single machine family made by a single manufacturer. Nor are there any translators which can convert PL/I programs to any other language. A PL/I user is simply locked in.

We knew that the analysts, headed by Raymond Rubey, were aware of the overall problem. Here is an extract from a panel discussion involving Rubey and Mary Lasky of Johns Hopkins University which took place last March.

Lasky: Another major factor in going to PL/I was that we were able to write a converter/translator from Fortran to PL/I. We wrote this in PL/I, so it helps with our transition of getting from one language to another. I know Mr. Althoff brought this up this morning as one of the considerations of looking at a language, and I think it's one of the very reasons that there have been so very few major programming languages so far: economic considerations inhibit the transition from one language to another.

Henderson: Was your decision to go to a 91 instead of, say, the CDC 6600, possibly dictated by the fact that a PL/I compiler would be available for it?

Lasky: Well, part of our discussions with CDC centered around the fact that if their equipment were chosen, we would want the capability provided in a high level language that was the kind of thing that would be provided in PL/I.

Rubey: As of this date, though, you don't really have machine independence because you're locked in with IBM. Suppose you wanted to go to a 6600 a year from now, or you wanted to go to a GE 635? So have you bought any machine independence by this movement?

Lasky: We are definitely out on a limb in that respect.

And yet – the analysts reported that PL/I was superior to the comparison languages in machine independence!

Summary

As a result of our examination of the questionnaires used, it appeared to *Computerworld* that reliance upon the data collected on the questionnaires would probably produce a result slanted in favor of PL/I.

The Study Results did rely on this data, in preference to the data collected as the test programs were written. *Computerworld* therefore feels that the Rubey Report Study Results should be disregarded.

However, *Computerworld* has examined the *facts* reported in the study and has tried to salvage some of the value of the work done. An article showing what the report does say will appear in the next issue.

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Humphrey Spells Out Views On Computers in Education

Special to Computerworld

WASHINGTON, D.C. – Vice President Humphrey in a statement on "Science to Serve a Nation," released just before the election, emphasized the role of computers in education. The report stressed that computers have a special part to play in the problems of science and engineering, including weapons development, atomic energy, and space, as well as in the problems of slums, pollution, housing, and human behavior. However, the particularly important area is "to bring great teachers and superior educational materials to every classroom through networks of knowledge," made possible by the computer and communications technology.

Responds to Computerworld

In a separate statement for *Computerworld*, the vice president pointed out that he had been one of the first public officials to advocate the use of computer technology in obtaining efficient government. He quoted his senatorial record, including legislation to implement, for presidential use, a wide range of management techniques to rationalize presidential decision making through operations research, systems analysis, and the Pert system. While in the Senate, he said, he also advocated the use of data processing for science information use and the use of computers for problem solving wholly aside from information retrieval.

Restructure Federal Science

He said that as President, he would continue a broad study of the adequacy of the government's science structure in meeting its rapidly expanding involvement in research. Pointing out that he had started this study while chairman of the Senate Government Operations Subcommittee in the late 1950s, the vice president said that the continuations would be with a view towards some reordering of the federal science structure and spurring privately sponsored research.

Humphrey also quoted his experience, while vice president, as chairman of the National Aeronautics and Space Council and of the National Council on Marine Resources and Engineering Development, and said he was well aware of the tremendous advances in these fields which would have been impossible without cybernetics. He also said that he kept up to date with the important roles computers now play in our society and quoted particularly his contacts with Francis Keppel, president and board chairman of General Learning Corp., who heads Humphrey's task force on education.

Nixon Statement

As previously reported in *Computerworld*, Richard Nixon has emphasized in his campaign the role of computers in bringing jobs to the people by providing an accessible data bank on available jobs.

'People Factor' Stressed During Bema Conference

By a CW Staff Writer

CHICAGO – The emphasis was on people rather than machines at the Business Equipment Manufacturers Association conference and exposition here Oct. 28-Nov. 1.

C.W. Spangle, vice president of Honeywell's EDP Division, set the theme when he said: "Our 'super baby' [the computer] might have made it as a 'super clerk,' but it won't make it as a 'management consultant' until those who make it perform mature in the effective usage of information technology."

The trend is from a machine oriented industry to a people oriented industry, he said in a speech read for him by W.R. Lonergan, vice president, government marketing, at RCA's Information Systems Division.

The job now falls to the users because each user's needs are different, and no idea the computer makers could develop would be applicable to all users, he said.

The need, more than ever, is to take professionals and train them in computers, instead of taking computer people and teaching them a profession, he said.

27,358 Attended

The exposition, at which more than 100 manufacturers displayed products, drew 27,358 visitors, Bema officials reported. They said the final figure might be a little higher.

"Our problem today," said Donald G. Milne, executive vice president, financial, Field Enterprises Educational Corp., "is not so much one of finding new ways to utilize computers as improving the quality of the installations that are presently being contemplated and installed by most companies."

He said that management must lay out the objectives, participate in the feasibility study, and evaluate the recommendations if the quality of installations is to be improved.

What Does 'Nothing' Mean?

William W. Martin, national point of sale project manager, J.C. Penny Co., warned that when a system gives no answer, that represents an implied answer. To avoid error in interpreting such answers, the extremes should be tested and arbitrary limiters should be used, he said.

Winston C. Dalleck, president, Winston Dalleck & Assoc., predicted that simualtion would become a part of management planning sessions, with the impact of ideas on a business being tested during such meetings via remote terminals.

Also stressing the people factor. Robert E. Wallace, vice president, Auerbach Corp., said that planning represents only about 1% of the cost of a communications network, yet the ultimate economy of the resulting system can be radically affected by the quality of the systems engineering.

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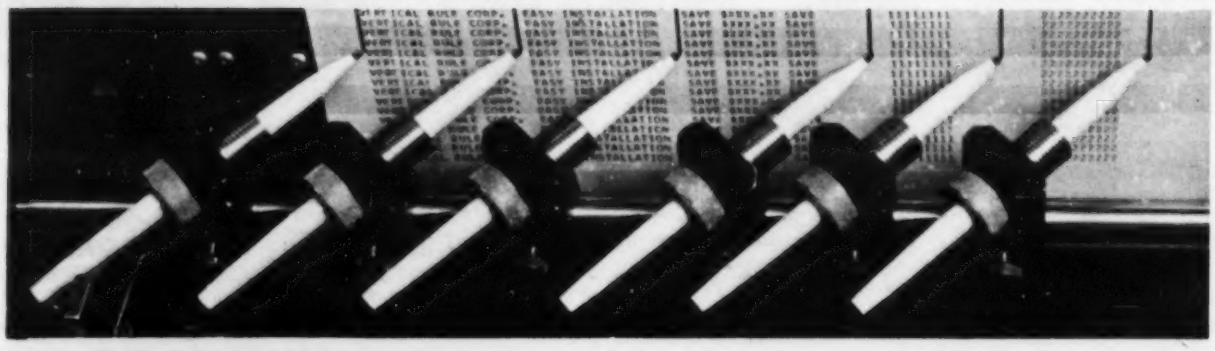

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Boothe Computer Forms British, Canadian Subsidiaries

SAN FRANCISCO – Boothe Computer Corp. has announced the formation of new subsidiaries in the United Kingdom and Canada.

Plans call for other subsidiaries to be operational by mid-1969 in Switzerland, Belgium, The Netherlands, and West Germany, Boothe said.

The British unit, Boothe Computer (U.K.) Ltd., should be in operation by the first week in December, Boothe said.

The Canadian unit, Boothe Computer, Ltd., headquartered in Toronto, was set up in late September. It is headed by R.A. Hewitt.

Boothe said the Canadian subsidiary will be financed by revolving bank credit. European financing has not been fully determined, but it may include bonds sold in England and local participation "where necessary," Boothe said.

Alphanumeric Inc. Opens Chicago Office

LAKE SUCCESS, N.Y. – Alphanumeric Inc., a supplier of computerized services and equipment, has leased office space in the O'Hare Office Bldg., O'Hare Airport, Rosemont, Ill. Richard Goodwin has been appointed midwestern regional sales manager, and Robert Vogeler, regional manager for systems and applications. The center is equipped with a photocomposer, IBM 360 computer, and automatic film processing equipment.

Mohawk Data Sciences To Build R&D Center

STONEHAM, Mass. – Mohawk Data Sciences Corp., producers of input and output equipment for computer users and the EDP industry, broke ground here for a new 65,000 sq. ft. center in the Cabot, Cabot and Forbes Middlesex Industrial Park. R.T. Pearson, MDS vice president and general manager for Boston operations, said that the new center will be engaged in advanced research and development in data processing.

Univac to Open New Production Facility

PHILADELPHIA – The Univac Div. of Sperry Rand Corp. announced plans to open a new production facility in Strasburg, Pa., for the production of precision computer components. Expected to begin operations by early November, the facility will be administered by the Philadelphia Manufacturing Operations Dept. of the Univac Data Processing Div. located in Blue Bell.

Market Compilation Opens New York Office

LOS ANGELES – Market Compilation and Research Bureau, N. Hollywood, a division of Rexall Drug & Chemical Co., announced the opening of a branch office in the Newsweek Bldg., 444 Madison Ave., New York. Stephen L. Allen has been appointed to direct operations.

Potter Opens Chicago Office

PLAINVIEW, N.Y. – Potter Instrument Co., Inc. has announced the opening of a sales office at 2200 E. Devon Ave., Des Plaines, Ill. William G. Rendall has been appointed area sales manager, according to Stephen J. Keane, vice president of marketing.

National Equipment Rental Expands Canadian Market

NEW YORK – National Equipment Rental, Ltd. announced that the company's Canadian activities will be conducted through Maple Leaf Leasing, Toronto, a wholly owned subsidiary.

ICC Expands Facilities

EL SEGUNDO, Calif. – Gary Goldstick, president of Information Control Corp., has announced the expansion of the company's facilities into a new, third building at 136-138 Oregon Ave. The company manufactures core memory systems, solid state light pens, digital modules, and data acquisition systems.

Clary Corp. to Build New Quarters

ARLINGTON, Texas – Clary Corp. will move its Construction Automation Div. from 5916 Tension Dr., Ft. Worth, to a new facility being constructed in the Great Southwest Industrial District here. Plans call for completion by Thanksgiving.

Orders and Installations

Kawecki Chemical Co., Boyertown, Pa., has leased a Honeywell 120 computer system to handle the company's financial and production services.

The University of Texas M.D. Anderson Hospital and Tumor Institute, Houston, has installed an SDS Sigma 5 computer system to use in the study and development of improved methods to treat and cure cancer patients. The new system, integrated with an analog computer, permits hospital personnel to perform cancer research and study programs focused on improved surgical, patient monitoring, and analytical procedures.

Emery University, Atlanta, has installed an RCA Spectra 70/55 computer system in its computing center for general administrative data processing as well as time sharing using Basic software. The new unit replaces an IBM 1410.

Bull General Electric, Stockholm, Sweden, has opened a commercial computer time sharing center to serve scientific, business, industrial, and educational customers in Sweden, Norway, and Finland.

East Midlands Gas Board, Leicester, England, has ordered a Univac 1108 computer system as part of a total management information system to be developed and implemented over the course of the next several years by the British Gas Authority.

The First Security Bank, Glasgow, Mont.; Bossier Bank & Trust Co., Shreveport, La.; and Emporia State Bank, Emporia, Kans., have ordered NCR Century 100 computer systems to implement Central Information File banking.

Timber Structures Inc., Portland, Ore., has placed an order for a Univac 9200 computer system for inventory and production control, estimating, job costing, and payroll processing. Delivery is scheduled for January.

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Built-In Computer Editor Aids Typists

(Continued from Page 1)

Control Systems, Inc., of Ann Arbor, Mich., claims that the Astrotype system will be a boon to typists not accurate enough to qualify for secretarial work. These girls will be able to produce perfectly typed pages by using

the computer's editing feature. It is estimated, the company said, that one out of every three girls who studies typing in school later fails to meet the accuracy requirements of business and must accept a less skilled job.

The computer aids the already well qualified typist by eliminating repetitive work – particularly the retyping of standardized material.

The maker said that previews of the system created high interest among lawyers, proposal writers, specification editors, medical report writers, publication editors, and others who must develop numerous "original" copies of semi-standard texts.

New Products

The system uses a modified PDP-8/L computer which is permanently preprogrammed before delivery. Each roll of magnetic tape holds up to 250,000 characters, and tapes for repetitive work can be dismounted and stored between jobs, the company said.

Carbonless Labels

New carbonless pressure sensitive labels have been created from chemically treated paper for the purpose of making duplicate, triplicate, or quadruplicate sets simultaneously. In pinfeed continuous form, quadruplicate sets can be printed out in one impression. Ever Ready Label Corp., 357 Cortlandt St., Belleville, N.J. 07109.

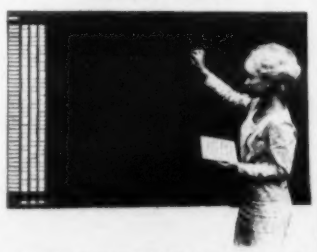
Digital Recorder

The Lockheed ADR 445 airborne incremental digital recorder is designed to record slow or medium rate, continuous or asynchronous data. The unit weighs 36 pounds and operates at rates up to 400 steps per second. The unit will generate IBM 729 compatible tapes and is Mil-Spec qualified. Lockheed Electronics Co., Plainfield, N.J.

Coating Computer

A new digital computer controls coating weight and reduces wastage in the manufacture of coated materials. The computer calculates the weight of a coating to provide a check on the quality of the product throughout its manufacture. It can be used in time sharing applications where two or more coating devices are monitored. Chart recorders and data logging devices are optional. The Loveshaw Corp., 1 Main St., Brooklyn, N.Y. 11201.

Control Board



A new magnetic visual control board, 48" x 72", comes equipped with magnetic letters and numbers, 12" write-on magnetic strips, and magnetic card holders of clear plastic. The boards are gridded in 1" x 2" pattern and framed in aluminum. Magna Visual, Inc., 1200 N. Rock Hill Rd., St. Louis, Mo. 63124.

Digital Printer

A new high speed digital printer, the Datalog MC2400, is offered in three models to print at speeds from 20 to 40 lps. Four line coded data input is accepted. Entry is bit parallel and column parallel. Operation is asynchronous and printing can begin at any character position on the print drum. Design features are a 12 or 15 character set, a hammer module, and a print drum attached directly to the shaft of a ball bearing motor. Litton Industries, Datalog Div., 343 Sansome St., San Francisco, Calif. 94104.

Top Loading Balance

A new automatic top loading balance, the Digimetric, supplies binary coded output for tying to a computer or other peripheral equipment. Capacity is 1200 grams. Sensitivity is 0.1 gram. An electronic tare circuit has been incorporated to eliminate physical attachment to the beam. Tare is 300 grams. Applications are routine weighings, transferring weight to printing equipment or to a memory storage system, or mass measurement in in-line process control. Readout is modular and removable from the weighing mechanism. Wm. Ainsworth & Sons, Inc., 2151 Lawrence, Denver, Colo. 80205.

Display Terminal

A new display terminal has a curve generator for graphics for drawing curves directly rather than approximating them with straight line segments. The Model 20, priced at $12,000, includes a storage type CRT, an alphanumeric input keyboard, and a character generator for alphanumerics. Options include templates, keyboards, and overlays. Computek, Inc., 905 Main St., Cambridge, Mass. 02138.

Software Firm Will Also Make, Lease Hardware

HOUSTON – Com-Share Southern, Inc. has announced a move into manufacturing and computer leasing with the formation of two wholly owned subsidiaries: Communications Logic, Inc. and Computer Equities, Inc.

Communications Logic, headed by James F. Jecker, will design and manufacture computer time sharing peripheral equipment, the firm said. Initial production is to include linking multiplexers, computer interface channels, remote terminals, and message switching equipment. CRT displays are to be added by the end of the year, the firm said.

Computer Equities, headed by William R. Moritz, will operate as a third party leasing company, Com-Share Southern said.

Webster College President Elected ACT Director

NEW YORK – Dr. Jacqueline Grennan, president of Webster College in Webster Groves, Mo., has been elected a director of Advanced Computer Techniques Corp.

NOTICE TO ADVERTISERS

There's still time to let Computerworld sell for you at the Fall Joint.
The monthlies are closed by now, but Computerworld's 2 FJCC issues are still open:

The Preview issue closes Friday, November 29 for space, and Monday, December 2 for copy. It hits the mails Wednesday, December 4.

The Show issue closes Tuesday, December 3 for space, and Thursday, December 5 for copy. It hits the mails Wednesday, December 11.

3000 of each will be distributed at the FJCC from the Computerworld booth, and both will be right up to the minute with the news of the industry.

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CIA Helps Develop Steno Tape Reader

By Joseph Hanlon
CW Assistant Editor

WASHINGTON, D.C. – The convenience of receiving a printed text the day after a meeting, conference, or court session may soon become a reality.

A computer aided system under development here will provide overnight transcription of notes from a stenographic recorder, the typewriter-like device used by court reporters. Transcribing the notes into English presently takes three hours for each hour of testimony. Consequently, many notes are not transcribed at all.

The Central Intelligence Agency is now testing a system to read stenographic recorder notes and transcribe them. Herbert M. Avram, manager of the Steno Automatic Transcription Development Project, told *Computerworld* that the system would eventually be available for courtroom use. He would not give an estimate of when it would be available, but did say, "I don't think it will be too long."

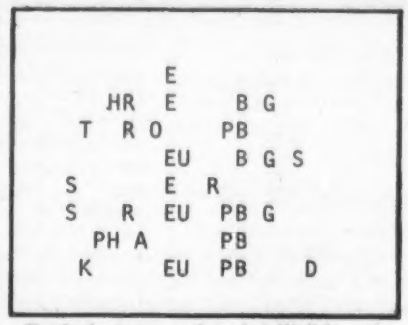
Many Uses Seen

He stressed that it had much broader application than courtroom use, and that the CIA's own interest was for recording conferences and meetings. "It can be used whenever you need a text the next day," he said.

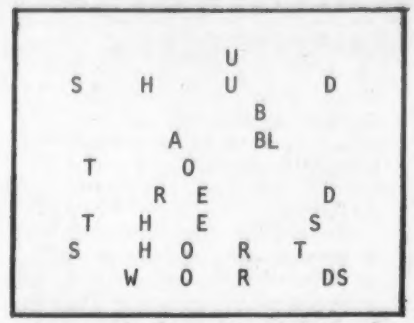
The stenographic recorder used by court reporters is like a small typewriter with 23 keys. Any combination of keys can be pressed simultaneously. Characters are printed on a paper tape 2-3/8" wide that advances automatically each time a key is depressed. There is no movable carriage, so a letter is printed in the same horizontal position each time it appears. This latter fact simplifies the problem of having a machine read the tape, since no character recognition system is required.

Several years ago, IBM designed the Steno Mark Reader, and one experimental model was built under CIA contract. It reads the stenographic notes with an optical device and then changes shorthand symbols into computer code on magnetic tape. Two hours of testimony can be read and stored on tape in four minutes, according to the designers at IBM, Scott Gilpin and Donald Mason.

Scott R. Gilpin and Donald R. Mason examine a stenographic recorder tape and lean on the Steno Mark Reader, which they designed.



Typical steno codes, intelligible only to a trained operator.



An example of easy to read steno code.

Errors an Early Problem

The tape is then processed by a computer which translates the steno codes into English. IBM's original translation program was unsuccessful, due to "cost effectiveness factors" and a 10% error rate, according to Avram.

The CIA and IBM worked together during 1964-66, designing and testing a system which included both machine translation and steno transcription. The Gilpin-Mason optical reader was part of the steno transcription subsystem. Then the CIA returned everything to IBM, but asked them to keep the reader itself in storage. Avram explained to *Computerworld:* "IBM lost interest in the project. But the reader itself is a good piece of equipment, and we saw more promise for the project than IBM did."

So the CIA began work on its own translation program, based on general purpose computers rather than the IBM special purpose hardware. They got back the experimental model of the Steno Mark Reader (the only one ever built) and began testing.

Too Many Dialects

Transcribing steno codes is not a simple problem. The 10% error rate in the original IBM translation system was almost entirely due to stenotypists using different shorthand codes, according to Gilpin and Mason. They suggested that all stenographers use the same codes, but this was impractical. Each reporter has his own modification of the basic shorthand. As one court reporter told *Computerworld:* "Everybody develops a few pet abbreviations."

The CIA translation system allows subdictionaries for each reporter to be added to the main dictionary, partially solving this problem.

Even with the new translation program, the stenotypists have some restrictions on the codes they can use. For example, they have restricted options on high frequency short words, such as "it" and "the," which can normally be coded in several ways.

Courtroom Test

Recently, the CIA, in cooperation with the Justice Department, has been testing the system in a criminal court in Washington. "We are quite encouraged; we know we are on the right track," Avram said.

Translation can never be perfect, however, and the stenotypists sometimes make mistakes in taking notes. Thus a procedure must be developed for making corrections after the translation is completed. This is the main remaining problem, and the CIA has been working on error correction techniques.

Discussing stenotypist errors, a representative of the Massachusetts Short Hand Reporters Association explained to *Computerworld:* "My notes aren't as good as they could be. People don't speak up, or two people talk at once; sometimes you don't get everything. But I can have a bad outline and still read it. You have to use your own judgment."

The CIA project manager conceded that the computer can read only what is written on the tape, and that in some cases stenotypists will still have to transcribe their notes by hand. But he stressed that this is less of a problem for a reporter at a controlled conference, and should not be a problem even in a courtroom "if the judge runs a controlled court."

Acceptance Foreseen

He also feels that once the system is in public operation, stenotypists will tend to adapt to it because it will save them so much time in the long run. Finally, he noted that stenotypists coming out of school will have been trained in the use of the system.

Gilpin and Mason gave a paper at an IEEE conference in May, 1968, which stressed that the Steno Mark Reader could aid foreign language translation by allowing a person to read a foreign text and translate it, dictating it in English to a stenotypist. The Steno Mark Reader would then aid in preparing the English transcription.

Avram said that language translation was not the purpose of the system at all, although he conceded that the CIA had experimented with foreign language translation using stenotypists.

Computer to Monitor Air Pollution

PITTSBURGH, Pa. – This heavy industrial area is attacking air pollution with the implementation of a countywide network of telemetering stations hooked directly to a computer.

The network – believed to be the first on-line air pollution monitoring system in the United States – will provide the Allegheny County Health Department with information on levels of pollution at any point in the county at any time. This, in turn, will allow the department's bureau of air pollution control ample time to advise residents of potentially dangerous situations, and to recommend effective countermeasures.

When fully operational within two years, the new computer based network will be comprised of 103 monitoring devices at 18 remote locations. Each station will be linked by telephone lines to an IBM 1800 data acquisition and control system at the Arsenal Health Center here.

Two Stations Operating

At present, two of the stations are operating – one in the Allegheny County Courthouse downtown, and the other in the city's Hazelwood section. Seven more are scheduled to go into service within six months.

Prior to implementation of the system, air pollution in Greater Pittsburgh was measured through the use of an electromechanical device which recorded information on six foot long strip charts. A total of 11 such charts was read daily, a number which would have increased to 103 with the planned expansion of the system.

"We intend to become the nation's leader in protecting the health of our citizens against polluted air," said Edward L. Stockton, chief of the bureau of air pollution control.

"We will be able to measure peak conditions of pollution at the exact times when accurate evaluation may be absolutely essential in guarding against harmful inversions or stagnations of air."

The bureau then will have the ability to recommend certain actions as soon as it becomes evident that a dangerous situation exists.

12 Pollutants Measured

The new system is designed to measure and evaluate 12 aspects of air pollution and meteorology, including sulfur dioxide, hydrogen sulfide, carbon monoxide, hydrocarbons, aldehydes, fine particulates, wind speed and direction, air temperature, solar radiation, oxides of nitrogen, and total exidants.

Air pollutants enter sensing instruments through probes at each remote location. The particles are analyzed and the readings transmitted over telephone lines to the Arsenal Health Center.

The computer isolates and prints out maximum readings from each remote location. It then averages readings a minimum of once per minute. This gives the average condition over any specified period. Total findings are printed out in engineering units, to be interpreted by the bureau staff.

A typical final printout – which will describe the level of pollution in terms of parts per million at any given air temperature – also will list the pollution level of all 12 atmospheric conditions at each of the remote locations.

4 Million Mice Create Inventory Problem

WILMINGTON, Mass. – The world's largest breeder of rats and mice for medical research has an unusual problem which the computer is helping to solve.

Its inventory keeps changing. Not just daily, but almost hourly. Not only in quantity (four million last year), but in quality as well.

The meticulously bred animals here at the Charles River Breeding Laboratories are used for the most exacting scientific experiments. Their genetic traits must adhere to rigid specifications set by science, government, and industry.

Some of the constantly changing physical characteristics that are evaluated when preparing daily open order files by customer are species, age, weight, sex, and surgical services performed.

In addition to analyzing the commitments for the more than 80,000 rats and mice bred here each week, the computer, an IBM 360/20, also provides such data as shipping charges, delivery instructions, and the animal's date of birth.

Charles River has long enjoyed an international reputation as the world's top supplier of germ free laboratory animals. Raised in biological isolation, they provide scientists with perfectly controlled subjects free of any contamination.

This is especially important in projects where animal reaction to a particular test must be beyond dispute. For example, 2000 animals have been shipped to Nasa's Manned Spacecraft Center in Houston as part of moon exploration experiments. Nicknamed "Astro-Mice," they will be exposed to the contamination (if any) of lunar material brought back from the moon.

In an average week, some 2500 boxes of rats and mice are shipped throughout the United States and often to Europe, the Middle East and even the Orient.

Small, Scientific Computers 'Converted' to Business Use

WELLESLEY HILLS, Mass. – The Saibol language [see story on page 1] is designed to permit the running of character oriented programs, which are common in business applications, on word oriented, small scale scientific computers.

The language uses Cobol-like statements but permits comments to be incorporated within instructions by enclosing the comments in parentheses.

The usual input unit is a paper tape reader and the usual output unit is a Teletype, which doubles as a console typewriter.

The use of the Teletype is considered particularly important because of the way in which Saibol will be used. William Landis of Infocom, the sole licensee for marketing the language, told *Computerworld* that the company normally expects its programs will be run by whatever girl is around the office after a small amount of training. The programs are written so that if an error occurs, fully understandable printouts will appear on the Teletype to tell the operator how to respond. In fact, the object programs provide for some conversations with the operator.

(EXCERPT FROM A TYPICAL SAIBOL-8 PAYROLL PROGRAM WITH NO COMMENTS)

```
NEXTRECORD, READ 215 WRONGTAPE
        HRS, ACCEPT HOURS HRS
             TAKING REGHOURS MULTIPLY RATE
             GIVING REGPAY 2 NOSIGN
             TAKE OVRHOURS MULTIPLY RATE MULTIPLY
             OVERTIME GIVING OVRPAY 2 NOSIGN
     OTHPAY, ACCEPT OTHERPAY OTHPAY
             TO REGPAY ADD OVRPAY AND OTHRPAY
             GIVING TOTALPAY 2 NOSIGN
             PRINT TOTPAY
             DO WITH
             IF YRLYFICA EQUALS MAXFICA PRINTDED
             TAKE TOTPAY MULTIPLY FICA GIVING
             CURFICA 2 NOSIGN
             IF CURFICA LESS MAXFICA PRINTDED
             MOVE MAXFICA CURFICA
  PRINTDED, PRINT DEDUCTIONS
     OTHDED, ACCEPT MISDEDUCTIONS OTHDED
             TO CUROTHR ADD CURWITHHOLDING AND
             CURFICA GIVING TOTALDEDUCTIONS 2
             NOSIGN
             PRINT TOTDEDUCTIONS
             FROM TOTPAY SUBTRACT TOTALDEDUCTIONS
             GIVING NETPAY 2 NOSIGN
             PRINT PAYCHECK
             TO CHECKNO ADD ONE GIVING CHECKNO
             # NOSIGN
             PUNCH LEADER
             PUNCH PAYRECORD
             GOTO NEXTRECORD
WRONGTAPE, PRINT WRONGTAPE ACCEPT GOCMND
             COMPARE GOCMD GO NEXTRECORD
             GOTO WRONGTAPE
```

(EXCERPT FROM A TYPICAL SAIBOL-8 PAYROLL PROGRAM DOCUMENTED WITH COMMENTS)

```
NEXTRECORD, READ (EMPLOYEE'S PAY RECORD. IF MORE THAN) 215
            (CHARACTERS, GO TO) WRONGTAPE
        HRS, ACCEPT (REGULAR AND OVERTIME) HOURS (IF FORMAT
             ERROR, GO TO) HRS
             TAKE REGHOURS (AND) MULTIPLY (BY) RATE GIVING
             REGPAY (WITH) 2 (DIGITS TO LEFT OF DECIMAL POINT
             AND) NOSIGN
             TAKE OVRHOURS (AND) MULTIPLY (BY) RATE (THEN)
             MULTIPLY (BY) OVERTIME (FACTOR) GIVING OVRPAY
             (WITH) 2 (DIGITS TO LEFT OF DECIMAL POINT AND)
             NOSIGN
     OTHPAY, ACCEPT OTHERPAY (IF FORMAT ERROR, GO TO) OTHPAY
             TO REGPAY ADD OVRPAY AND OTHPAY GIVING
             TOTALPAY (WITH) 2 (DIGITS TO LEFT OF DECIMAL POINT
             AND) NOSIGN
             PRINT TOTPAY
             DO WITH(HOLDING TAX) (OPEN SUBROUTINE TO CALCULATE
             WITHHOLDING TAX FROM TAX TABLE)
             IF YRLYFICA EQUALS MAXFICA (GOTO) PRINTDED
             (OTHERWISE) TAKE TOTPAY (AND) MULTIPLY (BY)
             FICA GIVING CURFICA (WITH) 2 (DIGITS TO LEFT OF
             DECIMAL POINT AND) NOSIGN
             IF CURFICA (IS) LESS (THAN) MAXFICA (GOTO)
             PRINTDED (OTHERWISE) MOVE MAXFICA (TO) CURFICA
  PRINTDED, PRINT DEDUCTIONS
     OTHDED, ACCEPT MISDEDUCTIONS (IF FORMAT ERROR, GO TO) OTHDED
             TO CUROTHR ADD CURWITHHOLDING AND CURFICA GIVING
             TOTALDEDUCTIONS (WITH) 2 (DIGITS TO LEFT OF DECIMAL
             POINT AND) NOSIGN
             PRINT TOTDEDUCTIONS
             FROM TOTPAY SUBTRACT TOTALDEDUCTIONS GIVING NETPAY
             (WITH) 2 (DIGITS TO LEFT OF DECIMAL POINT AND) NOSIGN
             PRINT PAYCHECK
             TO CHECKNO ADD ONE GIVING CHECKNO (WITH) # (DIGITS TO
             LEFT OF DECIMAL POINT AND) NOSIGN
             PUNCH LEADER (THEN) PUNCH PAYRECORD (AND) GOTO NEXTRECORD
WRONGTAPE, PRINT WRONGTAPE (THEN) ACCEPT GOCMND
             COMPARE GOCMD (TO) GO (IF EQUAL, GO TO) NEXTRECORD
             (OTHERWISE) GOTO WRONGTAPE
```

These examples from a Saibol payroll program, shown at left without comments and at right with comments, illustrate the ease with which the program can be read if comments are inserted in parentheses.

PL/I Version of SSP/360 Is Announced

WHITE PLAINS, N.Y. – A PL/I version of the Scientific Subroutine Package for System/360 (SSP/360) has been announced by IBM.

SSP/360 PL/I contains more than 100 mathematical and statistical subroutines which can be used separately or in combination with a user's own PL/I programs to solve computational problems.

The new program package includes mathematical capabilities for matrix and polynomial operations, numerical quadrature and differentiation, interpolation, approximation, smoothing, solution of equations, and other special functions. Subroutines for statistical operations include multiple regression, canonical correlation, analysis of variance, discriminant analysis, principal component analysis, nonparametric statistics, and distribution functions.

SSP/360 PL/I is scheduled to be available in the first quarter of 1969.

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Booth, Armco Steel Begin Merger Talks

Special to Computerworld

MIDDLETOWN, Ohio – Armco Steel Corp. here has begun negotiations with Boothe Computer Corp., San Francisco, for a possible acquisition of Boothe in an exchange of stock valued at approximately $80 million.

Boothe President D.P. Boothe, Jr. told *Computerworld* that negotiations hopefully would be completed by the end of November.

Any agreement between the principles is subject to approval by directors of both corporations and by Boothe stockholders. The merger also would be subject to a favorable Internal Revenue Service ruling making the stock exchange tax free, both firms said.

Share for Share Exchange

While neither side would comment on specific purchase terms, they have indicated that discussions so far have been on the exchange of one share of Armco convertible preferred stock for each Boothe common share held. The Armco preferred would be convertible into Armco common on a one for one basis.

For Armco, a successful purchase would mean further expansion outside the steel industry, a movement that company officials say they intend to continue.

For Boothe, who sold his first leasing company to Greyhound, it would be the second time he has sold a successful company.

Digital Reports 1st Quarter Results Up; Continued Growth Predicted

MAYNARD, Mass. – Digital Equipment Corp. has reported earnings of $1.6 million (53 cents a share) on revenue of $16 million for the first fiscal quarter ended Sept. 30, up from earnings of $1.2 million (41 cents a share) on revenue of $10.4 million in the same period last year.

Digital President Kenneth H. Olsen said that fiscal 1969 results are expected to exceed 1968 results, but declined to estimate by how much.

For the fiscal year ended June 30, Digital earned $6.8 million ($2.34 a share) on revenue of $57.3 million.

EDP Development Reducing Earnings, GE Official Says

Special to Computerworld

LOS ANGELES – The development of General Electric's computer business is having an "adverse impact on current earnings," J. Stanford Smith, vice president and group executive for the Information Systems Group, said at the company's recent annual information meeting here.

The company's nuclear power and commercial jet engine operations also are troublesome areas, officials said.

Computer Sell-Off Denied

In response to a stockholder's question, however, General Electric President Fred Borch denied rumors that the company planned to sell its computer business.

General Electric "has no desire or plan to sell any of its businesses," Borch said.

Great Potential Seen

"General Electric's information systems business is a growth opportunity of historic proportions," Smith said, estimating the market would top $25 billion by 1976.

Borch told the group that General Electric's total 1968 sales were expected to top $8 billion, compared with 1967 sales of $7.7 billion. He didn't estimate earnings.

"We haven't been doing as well as we should in [increasing] our earnings to match our sales growth," Borch said. "I have asked for renewed emphasis on improved earnings per share."

Last year, the company had earnings of $361.4 million ($4.01 a share). Earnings for the first nine calendar months were $234.3 million ($2.60 a share), down from $249.4 million ($2.77 a share) in the same period last year.

Computer Situation Improving

Smith said that General Electric has more than $1 billion in information systems equipment currently installed and operating throughout the world, and that the company now has more than 50 time sharing systems offering services to 100,000 businessmen and engineers in the U.S., Canada, Europe, and Australia.

Smith also said that the information systems group has "embarked on a vigorous course of innovation in promising new areas where we have great strength."

The process of integrating the operation of Bull-General Electric, headquartered in France, and GE Information Systems Italia with General Electric's U.S. operations "has been largely accomplished," Smith said, listing research, engineering, and manufacturing facilities at 12 locations in four countries, plus a licensing agreement in Japan.

Bull-General Electric is expected to become profitable "very shortly," Borch said before the meeting.

Leasco Considers Entrance To Hardware, Other Fields

Special to Computerworld

GREAT NECK, N.Y. – An entrance into the computer hardware field, the purchase of a life insurance company, and a 2-for-1 stock split are among the things under consideration by Leasco Data Processing Equipment Corp.

While Leasco admits that these and other items are under consideration, company officials are not revealing any details.

Leasco Chairman Saul P. Steinberg, for example, while being as cooperative as possible short of giving specific answers, would not tell *Computerworld* if Leasco's entrance into the hardware field would be through acquisition or by starting a manufacturing unit. Both are under consideration, was all he would say.

Details of the stock split could not be learned, but informed sources feel that it will be approved by the directors at their regular meeting this month or next.

Steinberg also declined to comment about earnings for the fiscal year ended Sept. 30 other than to say that he "would not go so far as" Leasco President Bernard Schwartz's answer to a financial analyst's guess that $26 million ($4.50 a share) "was in the ball park."

However, Steinberg did tell *Computerworld* that the company planned to cut back its investments in new computer equipment for the domestic market and concentrate on the European market.

Acquisitions

NEW YORK – Mobil Oil Corp. has bought an equity interest in Bradford Computer & Systems Inc., a small computer consulting concern here. Neither the percentage interest nor the purchase price were disclosed.

Mobil said it will probably use Bradford for part of its contracted computer services.

Continental Computer Seeks Pipeline Companies

WYNCOTE, Pa. – Continental Computer Associates, Inc. has reached an agreement in principle to acquire the Banister Pipeline Companies of Edmonton, Alberta, Canada, for approximately $10 million in Continental stock, convertible debentures, cash, and notes.

The agreement is subject to the execution of a definitive agreement between the companies and the approval of Continental's directors.

Continental is engaged in the leasing of IBM 360s and acts as consultants for computer programming and the design of computer systems.

Brandon Completes Buy Of Federated Printing

NEW YORK – Brandon Applied Systems, Inc. has acquired the Federated Printing Company, Inc. and the Federated Manufacturing Corp. Terms were not disclosed.

Data Tech International Bought By Progressive

PHOENIX – Progressive Investment Corp. and PIC Research and Development Corp. announced the acquisition of Data Tech International, Inc., a systems analysis and programming company. Terms were not disclosed.

Progressive is an investment company and PIC a research and development company.

Earnings Reports

APPLIED DATA RESEARCH
Six Months Ended June 30

	1968	1967
Revenue	$1,668,716	$1,378,057
Earnings	135,153	62,546
Shr Ernd	0.16	0.08
Year Ended June 30		
Revenue	$6,464,000	$3,653,000
Earnings	178,186	55,571
Shr Ernd	0.34	0.14

THE COMPUTER EXCHANGE
Year Ended June 30

	1968	1967
Revenue	$616,588	$388,955
Earnings	12,323	10,209
aShr Ernd	0.04	—

a—Stock initially offered April 15.

BOOTHE COMPUTER CORP.
3rd Quarter Ended Sept. 30

	1968	a1967
Revenue	$5,584,000	—
Earnings	418,876	—
Shr Ernd	0.29	—
Nine Months Ended Sept. 30		
Revenue	$10,190,000	—
Earnings	828,638	—
Shr Ernd	0.60	—

a—Comparative figures not available as the company was formed in July, 1967.

CALIFORNIA COMPUTER PRODUCTS
1st Quarter Ended Sept. 29

	1968	1967
Revenue	$4,082,960	$3,044,843
Earnings	271,199	220,217
aShr Ernd	0.12	0.10

a—Adjusted for a 2-for-1 stock split Nov. 1, 1967.

DATATRON, INC.
Year Ended June 30

	1968	a1967
Revenue	$736,370	—
Earnings	29,133	—
Shr Ernd	0.058	—

a—Comparative figures not available as the company was formed May 16, 1967.

ELECTRONIC ASSOCIATES, INC.
3rd Quarter Ended Sept. 27

	a1968	1967
Revenue	$9,709,016	$7,758,187
Earnings	62,053	(358,453)
Shr Ernd	0.02	(0.15)
Nine Months Ended Sept. 27		
Revenue	$27,388,566	$24,829,722
Earnings	(455,888)	(255,347)
Shr Ernd	(0.18)	(0.11)

a—Unaudited.

BUY SELL SWAP

For Sale
IBM M/A
083's, 047's, 402's
TLW Computer Industries
Atlanta, Georgia
(Also see TLW's Computer Corner, page 5)

MORE BUY SELL SWAP ON PAGE 10.

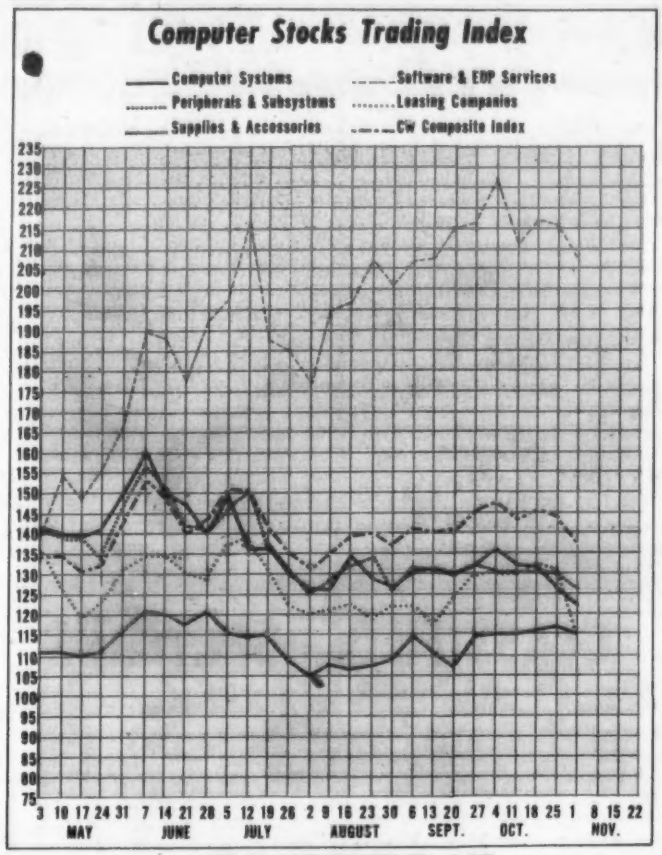
IBM COMPUTER SYSTEMS
In Inventory-Immediately Available
Sale or Lease

- 360/40 262K, 2 Channel CPU
- 1440, 16K, 3 disk
- 1401, 4K, Card System
- 1401, 8K, Card/Tape System
- 1401, 12K, Card/Tape System
- 1401, 16K, Card/Tape System

All under IBM Maintenance Agreement

THE COMPUTER EXCHANGE INC.
30 East 42nd Street, New York, N.Y. 10017
(212) 661-5870

360/20 FOR SALE
8K SYSTEM
2203 PRINTER
2560 M.F.C.M.
PRICE: $77,900
AVAILABLE IMMEDIATELY
Write Box 4601, Computerworld



BASE FOR EACH TRADING INDEX: 100 as of 3/1/68

Report Causes Big Leasing Stock Loss

By the CW Financial Staff

A major story in the Oct. 31 issue of *The Wall Street Journal* raising questions about the future of computer leasing firms apparently caught the financial community off guard, with the result that computer leasing stocks suffered a severe setback that day.

Although Oct. 31 was the only day that week that the Dow-Jones industrial average gained ground, *Computerworld's* Leasing Index dropped 9 points (7.1%) to 118, with every stock in the index group closing down. For the week ended Nov. 1, the index closed at 115, down 16 points (12.21%).

Entire Market Down

Since the entire stock market was off for the week, it is, of course, impossible to determine just how much of the drop was caused by the *Journal* story and how much by the general decline.

Of the major stock market indicators, the *Computerworld* Composite Average closed at 137, down 7 points (4.86%); the Dow-Jones industrial average, 948.41, off 12.87 (1.34%); the Standard & Poor's industrial average, 112.44, down 1.42 (1.25%); the New York Stock Exchange composite average, off 0.98 (1.67%); the American Stock Exchange price index, $30.34. down 65 cents (2.1%); and the N.Q.B. over-the-counter industrial average, 406.08, off 7.62 (1.84%).

Checking the *Computerworld* sector indicators, the Computer Systems index closed at 123, down 4 points (3.15%); Peripherals & Subsystems, 124, off 6 (4.62%); Supplies & Accessories, 115, down 2 (1.71%); and Software & EDP Services, 207, off 9 (4.17%).

Among the 20 most active stocks for the week on the NYSE were IBM and Bunker-Ramo. Closing at new highs for the year were Nashua Corp.; Planning Research; and Datamation Services; while Bolt, Beranek & Newman and Greyhound Computer dropped to new lows.

Market Commentary

The single most important news of the week was the bombing halt announced by President Johnson Oct. 31, but uncertainty about the reaction of the South Vietnamese government certainly had a depressing effect. However, the most important overriding factor tending to keep peace hopes from turning the market bullish was the overhanging presidential election.

But as Leslie M. Pollack of Reynolds & Co. says, "After all is said and done, we will either have Mr. Nixon or Mr. Humphrey in the White House (neither of which is a catastrophe), we will eventually have peace in Vietnam, and the stock market will then reflect the economy, which seems to be very strong."

Talks An Overriding Factor

But regardless of who is in the White House, an overriding market determinate in coming months will be peace talks.

Jay F. Gershkoff of C.B. Richard, Ellis & Co. says that after the election, if "960-965 becomes an obstacle and the Dow-Jones industrials penetrate 940 on the downside, it is then likely that a substantial reaction will follow ending the primary upward move.

"If on the other hand, buoyancy develops carrying the Dow-Jones industrials above 975, the market will probably test the 1000 mark within a short time thereafter, keeping the primary trend in tact.

COMPUTER STOCKS: TRADING SUMMARY

Week Ended November 1, 1968

EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	COMPUTER SYSTEMS	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
NYSE	163 3/8	239—157	226	* Burroughs	+ 6 1/4	+ 2.84	+ 38.33
NYSE	67 3/4	110— 54	59 1/2	Collins Radio	— 3 5/8	— 5.90	— 12.18
NYSE	101 1/2	174— 95	137 1/8	* Control Data	— 4 1/2	— 3.18	+ 35.09
AMSE	102	160— 95	140 3/8	* Digital Equipment	+ 4 3/8	+ 3.22	+ 37.62
NYSE	87 1/4	100— 81	94 1/8	General Electric	— 1 3/4	— 1.83	+ 7.88
NYSE	60	91— 59	81 3/4	Hewlett-Packard	— —	— —	+ 36.25
NYSE	93 1/8	144— 89	115 1/4	* Honeywell	— 3 3/4	— 3.15	+ 23.76
NYSE	288 1/2	375—280	309	* IBM	— 7 3/4	— 2.45	+ 7.10
NYSE	103 7/8	153— 40	117 1/2	* National Cash Register	— 7	— 5.62	+ 13.12
NYSE	46 7/8	55— 44	46 1/2	RCA	— 3/8	— 0.80	— 0.80
NYSE	39 1/8	53— 34	43 1/4	Raytheon	— 2	— 4.42	+ 10.54
OTC	22 1/2	66— 20	36	* Scientific Controls Corp	— 5	— 12.20	+ 60.00
NYSE	78 3/4	114— 72	81 3/4	* Scientific Data	+ 5/8	+ 0.77	+ 3.81
NYSE	45	63— 42	42	* Sperry Rand	— 1	— 2.33	— 6.67
AMSE	22 1/2	39— 20	27 1/4	* Systems Engineering Labs	— 1/2	— 1.80	+ 21.11

EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	PERIPHERALS & SUBSYSTEMS	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
NYSE	58 3/8	91— 52	79 1/4	Addressograph-Multigraph	— 6 1/4	— 7.31	+ 35.76
OTC	21	85— 45	51	Alphanumeric	— 6 1/2	— 11.31	+142.86
NYSE	29	38— 26	35 1/2	Ampex	+ 1 1/4	+ 3.65	+ 22.41
OTC	17 1/4	27— 14	14 3/4	Bolt, Beranek & Newman, Inc.	— 1 3/4	— 10.61	— 14.49
NYSE	13 1/2	20— 12	15 1/2	Bunker-Ramo	— 1 3/8	— 8.15	+ 14.81
AMSE	32 1/8	50— 27	33 7/8	* Calcomp	— 1 5/8	— 4.58	+ 5.45
OTC	24 1/2	49— 20	31 1/2	Cognitronics	— 3 1/2	— 10.00	+ 28.57
OTC	12	18— 10	14 3/4	Computer Equipment	— 3/4	— 4.84	+ 22.92
OTC	15 1/4	23— 13	16 1/2	* Data Products	— 1 1/2	— 8.34	+ 8.20
OTC	19 1/4	27— 16	17 3/4	* Digitronics	— 1/4	— 1.39	— 7.79
OTC	39	57— 32	48	* Electronic Memories	— —	— —	+ 23.08
OTC	10	29— 9	13	* Fabri-Tek	— 1/4	— 1.89	+ 30.00
OTC	17	35— 14	29 1/2	Gerber Scientific	— 3	— 9.23	— 13.24
OTC	12 1/2	26— 10	23 3/4	Information Displays	+ 1 3/4	+ 7.95	+ 90.00
AMSE	16 7/8	52— 14	24	Milgo Electronics	— 4 3/4	— 16.52	+ 42.22
AMSE	57 1/2	108— 54	62 1/4	* Mohawk Data Sciences	— 3 1/2	— 5.32	+ 8.26
OTC	74	145— 71	128	* Optical Scanning Corp.	— 7	— 5.20	+ 72.97
OTC	18	42— 16	31 1/2	Photon	— 2 1/4	— 6.67	+ 74.99
AMSE	25 5/8	38— 12	29	* Potter Instrument	— —	— —	+ 13.17
OTC	40 1/4	99— 38	82	* Recognition Equipment Corp.	— 7	— 2.25	+103.73
AMSE	16	29— 14	22	Rixon Electronics	— 1/4	— 1.12	+ 37.50
NYSE	46 1/8	66— 42	49 1/2	Sanders	— 1/4	— 0.60	+ 7.32
OTC	47	155— 53	80	Scan-Data	+ 15	+ 23.08	+ 70.21
OTC	40 1/2	51— 35	35	* Tally Corp.	— 2	— 5.41	— 13.58
NYSE	242 1/4	321—229	261 1/2	Xerox	— 8 1/2	— 3.15	+ 7.95

EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	SUPPLIES & ACCESSORIES	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
OTC	48 1/2	64— 37	44	* Acme Visible	+ 1/4	+ 0.57	— 9.28
NYSE	20 1/2	32— 18	18 1/4	Adams-Millis	— 1 1/8	— 5.81	— 10.98
OTC	13 5/8	22— 13	21 3/4	* Baltimore Business Forms	— 1/4	— 1.14	+ 59.63
AMSE	27	44— 21	28 3/8	* Barry Wright	— 2 1/2	— 8.10	+ 5.09
OTC	31 1/4	40— 26	37	Data Documents	— 1	— 2.63	+ 18.40
OTC	14 1/2	22— 10	21	Datatab	— 1/2	— 2.40	+ 44.83
OTC	27 1/4	38— 26	37 1/2	* Ennis Business Forms	+ 2 3/4	+ 7.91	+ 37.61
NYSE	84 1/8	119— 81	107 5/8	* 3M Company	— 1 1/4	— 1.70	+ 27.93
NYSE	58	98— 48	74 1/4	* Memorex	— 8 1/4	— 10.00	+ 28.02
OTC	27 1/4	32— 25	29	* Moore Business Forms	— —	— —	+ 6.42
NYSE	57 1/4	85— 47	85 3/8	Nashua Corp	+ 2 3/8	+ 2.86	+ 49.12
OTC	31 1/4	56— 40	45	Reynolds & Reynolds	— —	— —	+ 43.99
OTC	34 1/2	35— 24	28 3/4	* Standard Register	— —	— —	— 16.67
NYSE	37 3/4	44— 30	31 1/2	* Uarco	+ 3/8	+ 1.20	— 16.56
AMSE	14 1/4	23— 13	19 1/4	Wabash Magnetics	— 1 1/2	— 7.23	+ 35.09
OTC	25 3/4	36— 24	32 3/4	* Wallace Business Forms	— 1/4	— 0.76	+ 27.18

EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	SOFTWARE & EDP SERVICES	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
OTC	7 1/2	25— 7	18	Advanced Computer Techniques	+ 1 1/4	+ 7.46	+140.00
OTC	17	34— 14	33	* Applied Data Research	— —	— —	+ 94.12
OTC	15 1/2	24— 13	13 3/4	* Aries	— 1/4	— 1.79	— 11.30
AMSE	47	64— 42	60 3/8	Automatic Data Processing	— 2 3/8	— 3.79	+ 28.46
OTC	4	19— 4	11 1/4	Automation Sciences	— 1/4	— 2.17	+181.25
OTC	4 1/2	23— 3	15 1/2	* Brandon Applied Systems	— 1 1/2	— 8.82	+244.44
AMSE	22 7/8	43— 20	20 1/2	Computer Applications	— 3/4	— 3.53	— 10.38
OTC	5	15— 7	12	Computer Environments	+ 2	+ 20.00	+140.00
OTC	30	64— 24	63	Computer Network	— 1	— 1.56	+110.00
AMSE	40	64— 36	53 1/4	* Computer Sciences	— 3 7/8	— 6.78	+ 33.12
OTC	39	62— 28	31 1/2	* Computer Usage	— 2	— 5.97	— 19.23
AMSE	36 1/2	73— 36	72	* Computing & Software	— 1/4	— 0.38	+ 97.26
OTC	6 1/4	20— 5	20	Datamation Services	+ 1/2	+ 2.56	+220.00
OTC	12 1/2	20— 9	11	* Digitek	— 3/4	— 6.38	— 12.00
AMSE	38 3/8	52— 36	30 1/2	Electronic Computer Prog. Inst.	+ 1/4	+ 0.82	— 20.53
OTC	35	68— 32	63	* Informatics	— 1	— 1.60	+ 80.00
OTC	21	28— 14	16	Matrix Corp.	— —	— —	— 23.81
OTC	11 1/2	69— 8	60	* National Computer Analysts	— 2	— 3.23	+421.73
AMSE	31	54— 28	54	Planning Research	+ 2 3/8	+ 4.60	+ 74.19
OTC	a13 1/4	a15— 13	15 1/2	Programming & Systems	+ 1 1/4	+ 8.77	+ 16.98
OTC	9	15— 8	10	Software Systems	+ 1 3/4	+ 21.21	+ 11.11
OTC	20 1/2	22— 11	12 1/4	TBS Computing Centers, Inc.	— —	— —	— 40.24
OTC	a12	a12— 12	12 1/4	United Data Centers	— —	— —	+ 2.00
OTC	63	165— 57	151	University Computing	— 7	— 4.43	+139.68
OTC	a20	36— 20	32 1/2	URS Systems Corp.	— —	— —	— 10.96
OTC	a30	a30— 24	24	U.S. Time-Sharing	— —	— —	— 20.03

EXCHANGE	BASE PRICE 3-1-68	1968 RANGE	CLOSING PRICE	LEASING COMPANIES	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
OTC	18	55— 18	49	Boothe Computer	— 6	— 10.91	+172.22
OTC	4 1/4	24— 4	15	Computer Exchange	— 5	— 25.00	+252.94
AMSE	25 1/8	36— 21	22 3/4	* Computer Leasing	— 2 7/8	— 11.22	— 9.45
OTC	12 1/4	19— 11	11 1/2	* Cyber-Tronics	— 1 1/4	— 9.20	— 6.12
AMSE	106 5/8	184— 88	92 1/8	* Data Proc. Financial & General	— 17 7/8	— 16.25	— 13.60
OTC	12 1/2	17— 8	9	Datronic Rental	— 1/2	— 5.26	— 28.00
OTC	20	59— 18	42	Dearborn Computer	— 5 1/2	— 11.58	+110.00
OTC	13 1/4	19— 12	14 1/8	* DPA, Inc.	— 1 3/4	— 11.03	+ 6.60
AMSE	28 3/4	43— 25	25 3/8	* Greyhound Computer	— 4	— 13.62	— 11.74
AMSE	28 1/8	69— 36	44 1/2	Granite Equipment Leasing	— 5	— 10.10	+ 58.22
AMSE	49	116— 41	103 7/8	* Leasco	— 10 1/8	— 8.88	+111.99
OTC	5	14— 5	9	Lectro Computer Leasing	— 1	— 10.00	+ 80.00
AMSE	30 3/4	66— 27	53 1/4	* Levin-Townsend Computer Corp.	— 8 7/8	— 14.29	+ 73.17
OTC	10 1/2	16— .7	8	* LMC Data, Inc.	— 1/4	— 3.03	— 23.81
OTC	10 7/8	16— 10	13 3/8	* Management Assistance	— 2 1/4	— 14.40	+ 22.99
AMSE	41 5/8	53— 25	34 3/8	National Equip. Rental	— 5 1/2	— 13.79	— 17.42
AMSE	38	64— 35	39	* Randolph Computer Corp.	— 6	— 13.34	+ 2.63
OTC	10 1/2	53— 10	40	System Capital Corp.	— 4	— 9.09	+280.95
AMSE	10 7/8	22— 10	21 5/8	U.S. Leasing	+ 1/4	+ 1.17	+ 98.85

a—Since 10/18/68 *Companies included in Computerworld's stock trading index for each sector.

COMPUTERWORLD MEETING ANNOUNCEMENT COUPON

CHAPTER OF _____

TOPIC (SPEAKER) _____

MEETING PLACE _____, DATE _____

TIME _____

CHECK ENCLOSED FOR $130.00 FOR PACKAGE PLAN ENTITLING US TO 10 (2" x 1") MEETING ANNOUNCEMENTS PLUS 1 (2" x 3") SPECIAL EVENT ANNOUNCEMENT. WE WILL SEND ONE (1) COUPON FOR EACH SUCCESSIVE MEETING ANNOUNCEMENT.

CHECK FOR PLAN ALREADY SENT.

ALL NOTICES SHOULD BE RECEIVED BY COMPUTERWORLD 3 WEEKS PRIOR TO MEETING DATE

SPECIAL NOTE (IF ANY)_____

COMPUTERWORLD ANNOUNCEMENT DEPT., 60 AUSTIN ST., NEWTON, MASS. 02160

s m t w t f s calendar s m t w t f s

Nov. 10-13, New Orleans – Digitronics Users Assn. Meeting and Seminar. Contact: DUA, P.O. Box 113, Albertson, N.Y. 11507.

Nov. 19-21, Washington, D.C. – Course on Project Leadership. Contact: Tom Gildersleeve, Computer Usage Education, 51 Madison Ave., New York, N.Y. 10010.

Nov. 20-22, Boston – Annual Electronics Seminar. Contact: R.J. Mahoney, EDP Committee, American Gas Assn., 605 Third Ave., New York, N.Y. 10016.

Dec. 9-11, San Francisco – Fall Joint Computer Conference. Contact: Afips, 345 E. 47th St., New York, N.Y. 10017.

Jan. 15-17, Tampa, Fla. – Second Annual Simulation Symposium. Contact: Annual Simulation Symposium, P.O. Box 1155, Tampa, Fla. 33601.

Jan. 28-31, Ellenville, N.Y. – 1969 International Symposium on Information Theory. Contact: IEEE, 345 E. 47th St., New York, N.Y. 10017.

Feb. 13-14, Las Vegas, Nev. – Adapso Management Conference. Contact: J.L. Dreyer, Adapso, 420 Lexington Ave., New York, N.Y. 10017.

COMPUTERWORLD "COMPUTERWARE" CLASSIFIED SECTIONS

For more information or to place an ad, call or write Computerworld Classified Department, 60 Austin St., Newton, Mass. 02160 (617) 332-5606

SOFTWARE FOR SALE

Purpose –
- To provide a low cost marketplace for general and specific purpose program package for the benefit of both buyer and seller.

Rate Information –
- Rates per column inch 1-13/16" wide:
  1 Col. inch 10.00 per week
  2 Col. inches 20.00 per week
  3 Col. inches 25.00 per week
  4 Col. inches 30.00 per week
  5 Col. inches 35.00 per week
  6 Col. inches 40.00 per week
  7 Col. inches 45.00 per week

Minimum order 13 weeks (prepaid); less than 13 weeks rate is $14.00 per column inch; maximum ad size 7 column inches; sold only in even inches (no fractions).

Format –
- Headline
- Description of package use and configuration.
- Price: (Optional)
- Contact information
- No special borders, no reverses
- Logos allowed

SOFTWARE WANTED

Purpose –
- To provide at low cost a place where a user or software house can make known to the computer community a general or specific software need.

Rate Information –
- Open rate $14.00 per column inch (1-13/16" wide).
- Minimum size 1 inch.
- No maximum size.
- Minimum number of insertions – 1.
- Lineage discounts apply to large ads for long runs.

Format –
- Unspecified
- Borders allowed
- Headlines allowed
- Reverses allowed
- Logos allowed

TIME FOR SALE

Purpose –
- To provide at low cost a regionalized listing of available computer and machine time, time-sharing services, etc.

Rate Information –
- Rates per column inch 1-13/16" wide:
  1 Col. inch 10.00 per week
  2 Col. inches 20.00 per week
  3 Col. inches 25.00 per week
  4 Col. inches 30.00 per week

Minimum order 13 weeks (prepaid); less than 13 weeks rate is $14.00 per column inch; maximum ad size 4 column inches; sold only in even inches (no fractions).

Format –
- Headline
- Information about system or service.
- Price: (Optional)
- Contact information
- No special borders, no reverses
- Logos allowed

BUY SELL SWAP

Purpose –
- To provide at low cost a general market place for equipment, systems, services, supplies and the like for the computer community.

Rate Information –
- Open rate $14.00 per column inch (1-13/16" wide).
- Minimum size 1 inch
- No maximum size
- Minimum number of insertions – 1.
- Lineage discounts apply to large ads or long runs.

Format –
- Unspecified
- Borders allowed
- Headlines allowed
- Reverses allowed
- Logos allowed

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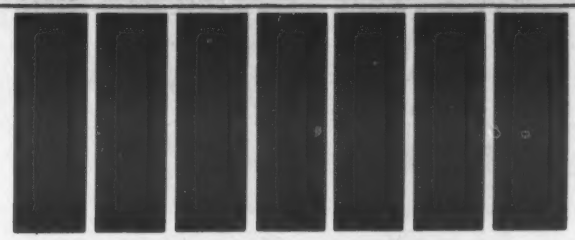

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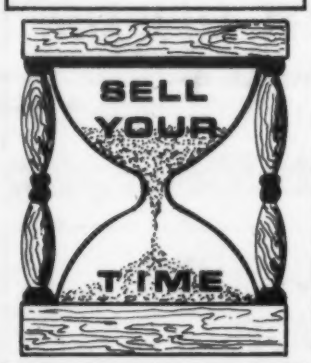

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Cobol Users Hit IBM Actio

(Continued from Page 1)

which suited IBM rather than at the user's convenience. It was pointed out that it was uncertain that anyone would want to convert to the new system no matter how much they wanted to standardize. This was because the IBM Standard Cobol compilers are now an unknown factor. A number of people cited their experiences with the early 360 Cobol compilers as being reasons why they would wait at least until the new compiler efficiency was known before planning any conversions.

Separate Development

In a separate development, the Cobol supporters also showed their strength by carrying into the enemy's court the argument as to whether PL/I is better than Cobol for business data processing. In a session on Cobol coding techniques, committee chairman Don Stanford provided direct comparisons between Cobol and PL/I, and claimed that PL/I had yet to prove its superiority.

Many PL/I supporters were in the audience, and Professor Robert Rosin, of the New York State University at Buffalo, objected to the citing of details from the Rubey Report on PL/I on the grounds that they were irrelevant. He said there were now later versions of the IBM PL/I compilers. Rosin finally walked out of the meeting.

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